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(ORR Project 20.740)

PIG IRON IN THE SOVIET BLOC

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PIG IRON IN THE SOVIET BLOCSUMMARY

Soviet Bloc production of pig iron in 1954 was 37.6 million tons,* an increase of 110 percent over 1938. The USSR produced 79.3 percent of the total. During this period Satellite production increased by 140 percent while Soviet output rose by 104 percent.

Although the USSR is the world's second largest producer of pig iron with a capacity as of 1 January 1954 equal to 39 percent of U.S. capacity, blast furnace construction has been lagging. This will result in the failure of the USSR to meet the production goal of 34 million tons annually by the end of the Fifth Five Year Plan.

Similarly, delays in and cancellations of construction of blast furnaces throughout the Satellites will result in a slowing down of the rate of increase in pig iron production over the next few years.

Reserves of iron ore, coking coal and other raw materials in the USSR are adequate to support expansion of pig iron production. However, utilization of these raw materials is dependent on the solution of many technological problems. Most urgent among these are the provision of iron ore agglomerating facilities and coal preparation plants.

The raw material base for current as well as expansion of pig iron production in the Satellite countries is extremely weak. In 1954, 63 percent of the iron ore requirements had to be imported. The USSR supplied 38 percent of total

* Metric tons are used throughout this report.

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requirements; the other 25 percent was obtained mainly from India, Brazil, Sweden, Norway and other Free World sources. Although the Satellites are essentially self-sufficient with respect to coking coal and metallurgical coke, the burden of supply rests mainly on Poland and Czechoslovakia.

The Soviet Bloc will probably expand pig iron availability commensurate with requirements; the USSR by investing more heavily in raw material preparation and speeding up blast furnace construction; the Satellites by expanding production facilities and importing iron ore as has been done in the past or by importing the pig iron itself.

A. Raw Material Resources

1. USSR

a. Iron Ore

The Soviet Union is the world's second largest producer of iron ore, mining 64 million metric tons in 1954 or about 80 percent of the United States output. The Satellites are heavily dependent on Russian Krivoy Rog ores, importing 6.7 million metric tons in 1954. Although iron ore reserves are ample to support an expanded blast furnace capacity, the iron content and physical characteristics have deteriorated steadily, particularly at Krivoy Rog and Mahnitogorsk, the two largest ore producers. The investment required for every new ton of blast furnace capacity is steadily rising because of the increased demand for raw material treatment. The most urgent problem confronting the material supply of the blast furnaces is the need for more agglomerating facilities. 1/

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~~S-E-C-R-E-T~~~~NOFORN~~b. Coke and Coking Coal

Although reserves of coking coals are adequate their utilization is hindered by the availability of types with complimentary coking properties necessary for blending in order to obtain an optimum coke. The abnormal incidence of ash and sulfur in coals of the Ukraine causes operating difficulties in Southern blast furnaces. The 1954 production of high temperature coke of 39.7 million metric tons is thought to be barely adequate. Difficulties encountered in the construction of new coal preparation plants and in locating new sources of coal with the requisite physical and chemical properties jeopardize plan fulfillment. 2/

c. Limestone

Limestone deposits are ample for future expansion and are widely distributed in most regions of the Soviet Union.

2. Satellitesa. Iron Ore

The iron ore found in the Satellite area is of relatively low grade, and exists in important deposits in Czechoslovakia and Poland only. These two countries, however, like all of the other pig iron producing Satellites, rely very heavily on the USSR for their supply of iron ore.

During 1954 total iron ore requirements for the Satellites amounted to 17.8 million tons of which 10.75 million tons were imported. Approximately 38 percent of the imports came from the USSR; the remainder, mostly high quality ore for blending purposes and other special uses, was procured from Sweden, India, Brazil, Norway and other Free World sources. 3/

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b. Coke and Coking Coal

Only Poland and Czechoslovakia are self-sufficient in coking coals, and export coal to other Bloc countries. In continental Europe only the Ruhr coking coal reserves are greater than those of Poland.

Poland, and to a lesser extent Czechoslovakia, supply practically all of the metallurgical coke required for pig iron manufacture in the European Satellite countries. Some of the other Satellites also produce metallurgical coke, but in relatively unimportant quantities. Some emergency shipments are made by the USSR. It may be said, therefore, that the European Satellites are essentially self contained with respect to metallurgical coke required for their pig iron production, with the important reservation that almost the entire burden of supply rests on Poland and Czechoslovakia. 4/

c. Limestone

Limestone is found in fairly wide distribution throughout the Satellite area, and presents no serious problem with respect to pig iron production.

d. Iron and Steel Scrap

Iron and steel scrap is consumed to a relatively limited and varying extent in Satellite pig iron production. Scrap is in consistently short supply throughout the European Satellites, where the primary requirement for steelmaking frequently is unsatisfied. 5/

e. Manganese

The Satellite area is almost completely lacking in manganese ore of metallurgical ferro grade, although ample reserves of low grade ore are found

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in Hungary, Rumania, Bulgaria, and to a lesser extent in Czechoslovakia. These ores, up-graded where necessary and supplemented by imports from the USSR, are used to take care of ironmaking requirements of the European Satellites. 6/

B. Pig Iron Production

1. USSR

The USSR is the world's second largest producer of pig iron with a capacity as of 1 January 1954 equal to 39 percent of the US. Table 1 shows the production and regional distribution of pig iron in the Soviet Union during the period 1952 to 1955. The USSR has 117 blast furnace plants containing 117 blast furnaces. Of the 29.8 million tons of pig iron produced in 1954, between 97 and 98 percent was cast from coke operated furnaces, the remainder being obtained from charcoal furnaces, primarily in the north Urals. The 29.8 million tons of pig iron produced in 1954 consisted of the following types: basic 21.4 million tons, converter 1.7, foundry 5.6, natural alloy 0.4, and ferro-alloys 0.7 million tons. 7/

The level of Soviet blast furnace technology is comparable to that of the United States. Exports of pig iron from the USSR amounted to one and two percent respectively of production in 1953 and 1954. Blast furnace construction has been lagging and will be the principle cause of pig iron failing to meet the production goal of 34 million tons annually by the end of the Fifth Five Year Plan. 8/

2. Satellites

Although basically handicapped by shortages and unfavorable distribution of most of the essential raw materials, pig iron production in the Satellites

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followed a sharply rising trend after World War II. Table II gives production figures for 1952 to 1955.

Currently there are 90 blast furnaces of various types and capacities in existence in Czechoslovakia, Poland, East Germany, Hungary, and Rumania. Although increased pig iron capacity in the Satellites would be highly desirable to support the steel production program, indications point to a pronounced slowdown in the rate of blast furnace construction. Specifically to illustrate this prospect the following instances are cited.

Bulgaria

Construction of the much publicized initial blast furnace at Dimitrovo has not been started. 9/

East Germany

Construction has stopped with 6 blast furnaces instead of 8 as planned for the J. V. Stalin plant. 10/ The revolutionary low-shaft blast furnaces at Calbe have been a disappointment (largely because of unsuitable raw materials), and only 10 furnaces have been built instead of 20 as announced. It is believed that the second 10 have been written off. 11/

Czechoslovakia

Plans announced during the early years of the current Five Year Plan for construction of 10 blast furnaces in Slovakia which would have added 1,500,000 MT per year to pig iron producing capacity, are not being implemented and probably have been abandoned. 12/

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Hungary

Possible additional pig iron producing capacity seems to be limited to the Stalinvaros Metallurgical Combine, where three additional blast furnaces have been scheduled as part of the Second Five Year Plan. 13/ These blast furnaces may or may not materialize.

Poland

Announced plans include the construction of additional blast furnaces as follows: 1 at Huta Bieruta; 2 at Krakow (formerly Nowa Huta); and 4 at Krakow (Nowa Huta III), a new plant announced for construction during the next Six Year Plan. 14/

Two additional blast furnaces at Hunedoara and one at Calan have been proposed, but there have been no indications of construction.

3. Soviet Bloc

It appears likely that the Soviet Bloc will expand pig iron production to keep availability commensurate with pig iron requirements. The USSR can achieve this by investing more extensively in raw material preparation and increasing the rate of blast furnace construction. The Satellites while hampered by a poor raw material base may, as in the past, expand production facilities and depend on imports of the necessary raw materials. The alternative would be to meet increased requirements by larger imports of pig iron itself.

C. Soviet Bloc Trade in Pig Iron

Exports of pig iron from the Soviet Bloc to the Free World amounted to 384,000 tons in 1954 and 425,000 tons in 1955. In 1952 and 1953 only negligible

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token shipments were made to the West. All shipments originated in the USSR.

Imports of pig iron from the Free World have been minor; totalling 51, 74 and 16 thousand tons in 1953, 1954, and 1955 respectively. All pig iron was imported by the Satellites and was shipped mainly to East Germany.

In 1952 all of the Satellite countries were dependent on shipments of pig iron from the USSR. During the past three years only East Germany appears to have relied heavily on pig iron supplied by the USSR; having received 22, 15 and 19 percent of its supplies in 1953, 1954, and 1955 respectively. Trading in pig iron among the Satellite nations has been negligible.

Table III gives exports of pig iron from the USSR for 1952 to 1955. Table IV shows Satellite imports of pig iron for the same years.

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Table I

USSR
Regional Distribution of Pig Iron Production 16/
1952-1955

Region	1952	1953	1954	Percent
(Billion)				
USSR (Metric tons)	25.1	27.4	29.8	32.4
I - Northwest	0	0	0	0
II - West	0	0	0	0
III- South	49.2	49.7	50.7	51.7
IV - Southeast	0	0	0	0
V - Transcaucasus	0	0	0.5	1.0
VI - Volga	0	0	0	0
VII- Center	8.2	8.1	7.7	7.5
VIII- Urals	33.5	33.2	31.3	32.0
IX - Western Siberia	7.5	7.2	6.8	6.8
X - Central Asia	0	0	0	0
XI - Eastern Siberia	0	0	0	0
XII- Far East	0	0	0	0
Unallocated	1.6	1.8	3.2	1.0
Total	<u>100</u>	<u>100.0</u>	<u>100</u>	<u>100</u>

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Table II

Production of Pig Iron in the Satellite Countries
1952- to 1955

Country	Thousand Metric Tons			
	1952	1953	1954	1955
Czechoslovakia	2,300 a/	2,500 a/	2,800 a/	2,900 a/
Poland	1,700 b/	2,000 c/	2,400 d/	2,600 e/
East Germany	650 f/	1,100 f/	1,310 g/	1,500 h/
Hungary	600 i/	650 j/	700 j/	750 j/
Rumania	425 k/	450 k/	610 l/	650 l/
Total European Satellites	5,675	6,700	7,820	8,400

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c. Estimate - extrapolation of 1952.

d. Estimate based on statement that steel industry was behind plan, Nowa Droga, Warsaw, May 54.

e. Estimate - extrapolation of 1954.

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j. Estimate based on plant study prepared for CIA/RR 23.608, in preparation. S.

k. Agerpress, Bucharest, 6 Sept 54, U. Eval RR-3.

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1952 to 1955

Importing Country	Thousand Metric Tons			
	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>
East Germany	250	225	225	300 <u>a/</u>
Czechoslovakia	110	na	na	na
Hungary	60	na	na	na
Bulgaria	10	na	na	15
Rumania	25	33 <u>b/</u>	1	na
Finland	1	na	na	0
United Kingdom	0	0	130	100 <u>b/</u>
Italy	na	2	111	115
Argentina	0	0	60	60 <u>b/</u>
West Germany	na	na	na	50
Norway	5 <u>b/</u>	na	na	na
Belgium-Luxemburg	5	4	30	100
The Netherlands	0	0	53	na
North Korea	na	na	2	na

a/ Plannedb/ Trade Agreement~~NOFORN~~~~S-E-C-R-E-T~~

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Table IV

Imports of Pig Iron by the Satellite Countries 18/
1952 to 1955

<u>Importer</u>	<u>Year</u>	<u>Thousand Metric Tons</u>	
		<u>USSR</u>	<u>Free World</u>
East Germany	1952	250	7
	1953	225	27
	1954	225	70
	1955	300	--
Poland	1952	---	--
	1953	---	15
	1954	---	--
	1955	---	--
Czechoslovakia	1952	110	1
	1953	---	9
	1954	---	4
	1955	---	1
Rumania	1952	25	---
	1953	33	---
	1954	1	---
	1955	---	---
Hungary	1952	60	---
	1953	---	---
	1954	---	---
	1955	---	---
Bulgaria	1952	10	---
	1953	---	---
	1954	---	---
	1955	15	---

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